

# Brook Trout in Massachusetts:



Photos by Bill Byrne

## A Troubled History, A Hopeful Future

by Kathleen Campbell

Brook trout are one of the most beautiful and beloved fish in the Eastern United States. In Massachusetts, anglers prize opportunities to catch brookies in the Berkshires and the rare salters on the Cape. Brook trout survive in only the coldest and cleanest water, and they serve as indicators of the health of the rivers and streams they inhabit. As such, brook trout often act as the “canary in the coal mine” to signal the excellent health of a waterway or alert us to potential water quality problems.

Brook trout populations have been in decline in Massachusetts over the past several hundred years, largely due to pressures associated with urbanization and other development. The Massachusetts Division of Fisheries and Wildlife is actively working with federal and state partners, as well as conservation organizations such as Trout Unlimited, to restore the brookie throughout its historic Eastern range.

### Origins of the Eastern Brook Trout Joint Venture

In 2002, the Sport Fishing and Boating Partnership Council recommended the development of a collaborative program to address aquatic restoration on a regional scale. In response, the U.S. Fish & Wildlife Service and the International Association of Fish & Wildlife Agencies took the lead in establishing the National Fish Habitat Initiative (NFHI). This program is modeled on the highly successful North American Waterfowl Management Plan, a partnership program implemented in the 1980s to restore and protect millions of acres of wetland breeding areas for waterfowl.

The National Fish Habitat Initiative is intended to foster targeted, regional partnerships that draw on local knowledge and current scientific information to restore and protect aquatic habitats and reverse the decline of fish species.

The Eastern Brook Trout Joint Venture is the first pilot project to be conducted under the NFHL.

This collaborative, non-regulatory program aims to assess the status of the eastern brook trout throughout its native range; identify local and regional threats to populations; develop state-based conservation strategies; and track and quantify progress and results. The Joint Venture is also conducting an extensive public outreach and education campaign.

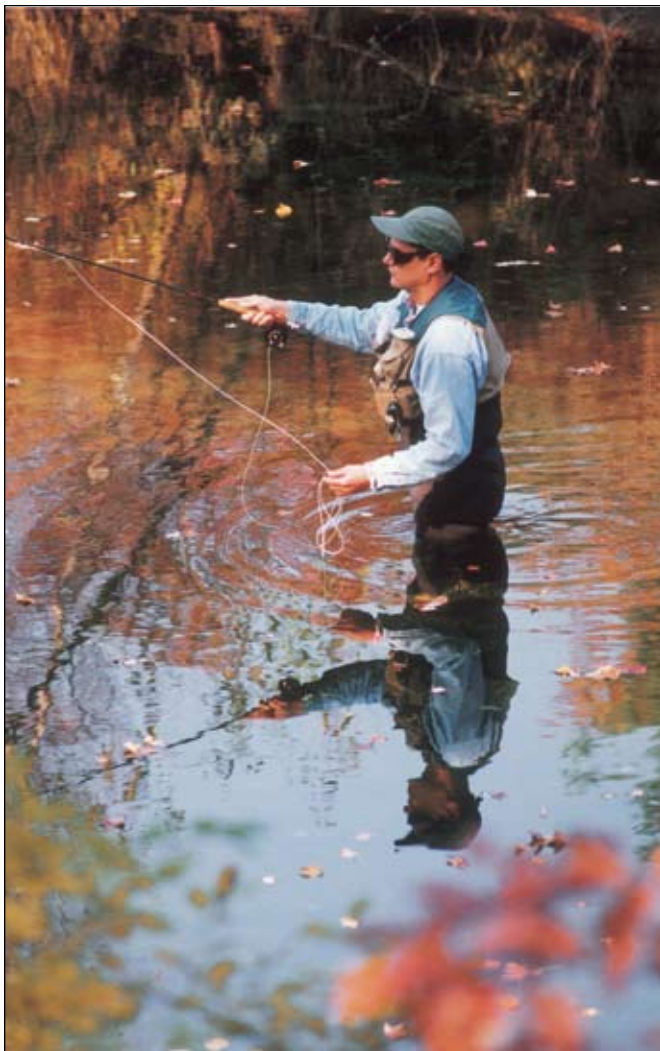
The Massachusetts Division of Fisheries and Wildlife is the primary participant on behalf of the Commonwealth. Mass-Wildlife is partnering with the following members of the Joint Venture:

- Fish and wildlife agencies from 16 other states
- Federal entities including the U.S. Geological Survey, U.S. Forest Service, U.S. Fish & Wildlife Service National Park Service and Office of Surface Mining
- Conservation organizations including the International Association of Fish & Wildlife Agencies, Trout Unlimited, Izaak Walton League of America, Trust for Public Land, and The Nature Conservancy
- Academic institutions including the Conservation Management Institute at Virginia Tech, and James Madison University

*Brook trout (facing page) have been the native favorite of Yankee sport men for more than two centuries, but landclearing and mill construction in the 18th and 19th centuries, followed by the flood control operations and road/housing development of the 20th century, have taken a heavy toll on the coldwater habitats that brook trout require in order to thrive.*

## Assessing Brook Trout Populations

As noted above, the first stage of the Eastern Brook Trout Joint Venture is the assessment of brook trout populations throughout their historical range. Brookies once thrived in most of the waters throughout Massachusetts. In order to determine their current status, the Joint Venture's Assessment Team worked with Todd Richards and other biologists at the Massachusetts Division of Fisheries and Wildlife to collect existing data on brook trout populations at the subwatershed level. (While subwatersheds vary in size, they typically contain 25 to 75 miles of streams and



## Status of Brook Trout in Massachusetts

Brook Trout Classifications Subwatersheds	Number of Subwatersheds	Percentage of
Intact (>90% habitat occupied)	1	<1%
Reduced (50-90% habitat occupied)	29	10%
Greatly Reduced (<50% occupied)	80	28%
Present, Qualitative Data Only	34	12%
Extirpated	20	7%
Absent, Unclear History	4	1%
Unknown, No Data	119	42%
Total	287	100%

cover an area roughly the size of that encompassed by a standard USGS topographic map.)

The Assessment Team and Mass-Wildlife's fisheries biologists then classified each individual subwatershed based on the percentage of historically occupied habitat still maintaining self-reproducing populations of brook trout. For example, a subwatershed is classified as "intact"

when 90-100% of the historically-occupied habitat within that sub-watershed currently supports self-reproducing populations. The table above lists the seven classifications and the percentage of Massachusetts subwatersheds that fall into each category.

Less than 11% of the subwatersheds in Massachusetts support intact or reduced brook trout populations. These relatively healthy populations are located primarily in the Berkshire and Taconic mountains in the western part of the state, and within portions of the Hoosic, Deerfield and Westfield drainages and several tributaries of the Connecticut River. In 28% of subwatersheds, brook trout are greatly reduced, occupying only isolated headwater stream sections. The Boston metropolitan area has lost the greatest amount of brook trout habitat in the state.

Very little data is available for the eastern portion of the state (south of Boston to Cape Cod). In addition, 12% of Massachusetts' subwatersheds—largely in the central part of the state (see map, right)—have only qualitative data to document the presence of brook trout, but no scientific data exists to classify their population status.

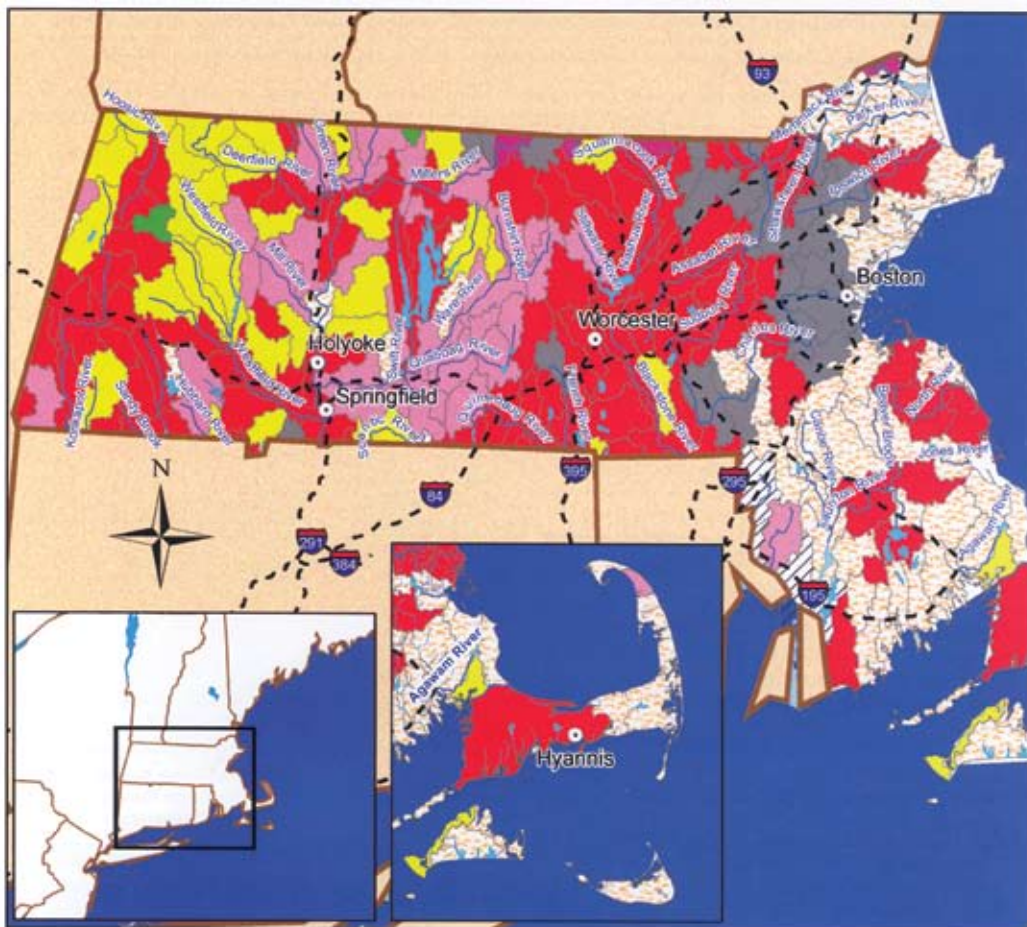
### Threats to Brook Trout in Massachusetts

Once the Joint Venture Assessment team and MassWildlife's biologists had classified the subwatersheds in the state, the biologists then used their expert knowledge to list the greatest



Photo by Bill Byrne





### Legend

- Rivers
- Lake
- Interstate
- Intact (1)
- Reduced (29)
- Greatly Reduced (80)
- Qualitative Presence (34)
- Extirpated (20)
- Absent, Unclear History (4)
- Unknown, No Data (119)
- Never Occurred (19)
- Cities

0 15 30  
Miles



Map data derived from state and federal data and compiled in EBTJV assessment results titled, Distribution, status, and perturbations to brook trout within the eastern United States, 2006. Authored by Mark Hudy, US Forest Service; Teresa Thieling, James Madison University; Nathaniel Gillespie, Trout Unlimited; Eric Smith, Virginia Tech. Map created on 2/24/06 by Nathaniel Gillespie, Trout Unlimited.



*The Eastern Brook Trout Joint Venture — the first pilot project of the groundbreaking National Fish Habitat Initiative — produced this map to illustrate the current status of the brook trout in Massachusetts in relation to its historical range. Data remains incomplete in some areas (particularly south of Boston to Cape Cod) and is limited to simply "present/absent" in more than 10% of the subwatersheds involved, but it certainly provides a starting point for restoration. Brook trout require clean, cold, well oxygenated water to survive; as a result they have disappeared from many waters that have been fragmented by dams and culverts (which act as barriers that isolate populations and prevent the fish from reaching spawning or summer refuge sites) or damaged by heavy sedimentation, various pollutants, or habitat alterations which have increased water temperature beyond what the species can tolerate.*

local threats to wild, self-reproducing brook trout and their habitat. Threats were identified as high, medium or low; the table below lists the top five high- or medium-level threats to brook trout subwatersheds in Massachusetts. Note that the figures do not add up to 100% because zero, one, or multiple threats may exist in each subwatershed.

Massachusetts rivers and streams are heavily burdened by dams and roads. Regional experts identified dam fragmentation as a high or medium disturbance in 65% of all subwatersheds where brook trout status is known. Dams inundate habitat and increase water temperatures by slowing down flowing water and exposing it to the sun.

as the second and third most common disturbances to brook trout habitat. In addition, streamside (riparian) and in-stream habitat degradation were listed as factors in over 50% of the state's brook trout subwatersheds where data is available. Instream habitat losses often result from gravel mining, flood control manipulation and loss of trees.

### Moving Forward: Conservation and Restoration Opportunities

Despite their sensitivity to declines in water quality, brook trout have managed to persist in many headwater streams in Massachusetts and throughout the eastern United States, and biologists are

## Principal Threats to Brook Trout in Massachusetts

Disturbances (High or Medium)	Number of Subwatersheds	Percentage of Subwatersheds
Dam Inundation/Fragmentation	106	65%
Stream Fragmentation (Roads)	100	61%
Sedimentation (Roads)	96	59%
Riparian Habitat	93	57%
Instream Habitat	91	56%

Dams and culverts often form barriers to fish movement, effectively cutting streams into biological fragments. Small, isolated populations of brook trout without connection to a larger population run the risk of vanishing over time as they succumb to natural flood and drought cycles. Because these fragmented populations are isolated from one another, if a population disappears, it cannot be reestablished by other fish from downstream. Removing or breaching unnecessary dams can restore a biological connection between isolated populations, reduce summer water temperatures and reestablish lost stream habitat. Allowing the water to flow free again allows it (especially during the spring melt) to scour and remove mud and other sediments that accumulate behind obstructions and reduce brook trout spawning and feeding habitat.

Regional experts ranked stream fragmentation and sedimentation from roads

optimistic that habitat protection and restoration . Many opportunities currently exist for the restoration of brook trout habitat. As Todd Richards, MassWildlife Aquatic Biologist, observes: "While the results of the Joint Venture report are sobering, we are already pursuing many opportunities for conservation of our remaining high-quality habitat, as well as restoration of impaired streams. Our collective challenge is to protect the best remaining habitat and restore the rest."

The Massachusetts Division of Fisheries and Wildlife is currently working with other state and federal agencies and the members of the Eastern Brook Trout Joint Venture to identify conservation priorities. For example, replacing poorly designed culverts and removing old dams that block fish movement can reconnect fragmented habitat and strengthen or extend brook trout populations downstream. Instituting best management practices to reduce sedimentation from



*Results are striking and rapid when an obsolete dam such as this one (inset) on Yokum Brook in Becket is taken down to restore free-flowing habitat .*

roads can greatly reduce runoff into brook trout streams. Protection of remaining high quality brook trout habitat can ensure that brook trout populations and drinking water quality remain healthy into the future.

Massachusetts citizens who enjoy fishing or recreating can play a significant role in advancing brook trout restoration efforts in the Commonwealth. By voicing support for these conservation programs and getting involved in restoration opportunities in their local communities, citizens can help guarantee long-term support for these efforts. Collective efforts to restore the brook trout will enable us to protect human health, assure clean and sustainable water supplies, and preserve our quality of life for generations to come.



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Sections of this article were drawn from the report "Eastern Brook Trout: Status and Threats," which was produced by Trout Unlimited in coordination with the Eastern Brook Trout Joint Venture. Rangewide information and details on brook trout restoration opportunities are available at [www.brookie.org](http://www.brookie.org).

The maps and data in the report are based on "Distribution, Status, and Perturbations to Brook Trout within the Eastern United States," a technical report by the Joint Venture's assessment team that will be published later in 2006. This first-of-its-kind assessment paints a comprehensive picture of the condition of brook trout populations across their native range from Ohio to Maine to Georgia. The technical report categorizes a variety of threats to brook trout and their habitat and helps to identify restoration and protection priorities. Using satellite imagery and statistical analysis, the report predicts the status of brook trout in areas that lack population data and identifies different levels of environmental stress that brook trout are able to tolerate before they are likely to disappear.